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ABSTRACT

Designed to provide a broad introduction to the subject of educational objectives, this booklet discusses an objectives-based approach to course design, highlights the key role played by educational objectives in any systematic approach to course or curriculum design, distinguishes between the terms "aims" and "objectives," and presents basic guidelines for writing objectives, including a consideration of the Magerian approach (behavioral objectives). In addition, three categories of educational objectives are defined as those obtainable in the cognitive domain, the affective domain, and the psychomotor domain, and Benjamin Bloom's taxonomies of educational objectives are examined. Finally, the advantages and disadvantages of an objectives-based approach to course design are reviewed, and suggestions are presented for establishing criteria for choosing valid objectives in a given instructional situation. A schematic representation of the systems approach to course or curriculum design is provided, and a listing of four sources for further reading is included. (KM)

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Educational Objectives

Introduction

This booklet provides a broad introduction to the subject of *educational objectives*. It begins by highlighting the key role played by such objectives in any systematic approach to course or curriculum design, and distinguishing them from their 'close relatives', *aims*. Next, it offers some basic guidelines on how objectives can be written, and outlines the different categories of educational objectives that have been identified. Finally, it reviews some of the advantages and disadvantages of an objectives-based approach to course design, and suggests how to set about establishing criteria for choosing valid objectives in a given instructional situation.

An objectives-based approach to course design

The formulation of precise educational objectives is usually considered to be the first crucial step in any systematic (or *systems*) approach to course or curriculum design, a process that is shown in schematic form in figure 1. As can be seen, the process is basically cyclic in nature.

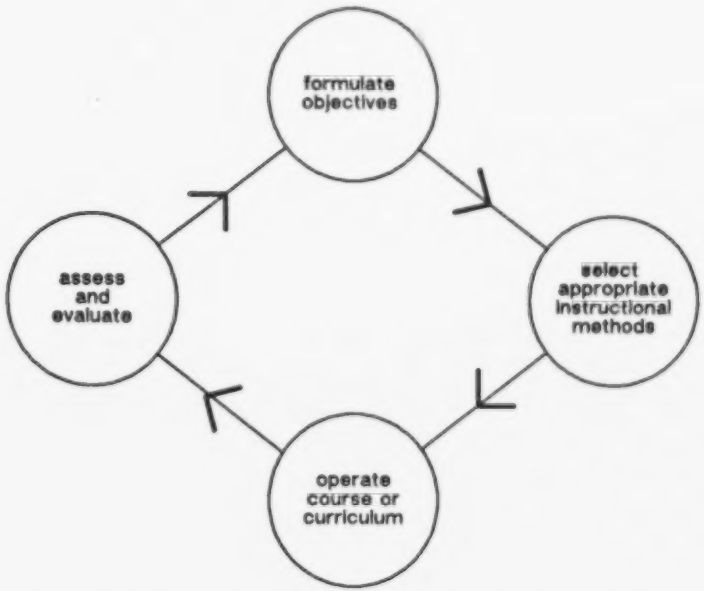

Figure 1: schematic representation of the systems approach to course or curriculum design.

Within such a system, the original objectives on which a course or curriculum is based serve three basic functions. First, they help to define the general direction of the course or curriculum and indicate the sort of material that should be covered. Second, they give some guidance as to what teaching/learning methods should be employed. Third, they are of considerable assistance in planning assessment procedures. The objectives can, of course, subsequently be modified in the light of experience gained during the operation phase; indeed, on-going modification of *all* aspects of a course or curriculum is one of the key features of the system.

Objectives should, of course, always be formulated taking due cognisance of the relevant existing skills and knowledge of the target population, together with their level of maturity and the nature of the topic area in question.

Aims and objectives

Let us now look at what is meant by the terms 'aim' and 'objective' when used in an educational or training context. In common language, the two terms are almost synonymous, meaning: 'that at which we decide to direct our energies'.

In the jargon-filled world of education and educational technology, on the other hand, they have each been endowed with a special meaning, and, to some, with an accompanying aura of mystique. However, no such mystique need surround the terms 'aim' and 'objective' – even when they are qualified by the adjective 'educational', or even 'behavioural' – as long as we appreciate their distinctly separate roles and functions.

Educational *aims*, first of all, are normally considered to be broad or general statements of educational intent. They usually indicate the overall purpose or desired goal of a course or part of a course.

Educational *objectives*, on the other hand, are collections of more precise, more detailed statements relating to different aspects of the fulfilment of specific aims. In the generally-accepted usage of the word, objectives have taken on the status of definitive descriptions of desirable educational outcomes, often expressed in terms of what students should be able to *do* at the end of their course. (In jargon terms, they express the *terminal behaviour* of the students, and are called *behavioural objectives.)* Thus, objectives should, as a conquence, lend themselves to accurate assessment.

In order to illustrate the difference between aims and objectives, let us look at a specific case, namely, a typical basic chemistry course. One of the general aims of this particular course is given below, together with some of the detailed objectives that have been formulated in order to ensure that the aim is in fact achieved.

Aim: To develop an understanding of the properties of chemical bonds and of the principles of bonding.

Objectives: At the end of the course, the student should be able to:

(i) Define the term *orbital* in terms of the probability of finding an electron in a given region of space;

(ii) Define the terms *s*–, *p*– and *d*– electrons;

(iii) Given the atomic number, write the electronic configuration of an atom or ion in terms of *s*–, *p*– and *d*– electrons;

(iv) Define the terms *ionic*, *covalent* and *coordinate bond* and describe these bonds in terms of the electronic interactions involved;

(v) From a knowledge of the position of two elements in the periodic table, describe the likely types of bond formed between these elements;

(vi) Define the terms *electronegativity* of an element and *polarity* of a bond;

(vii) List *five* of the important properties of bonds, namely: i) strength, ii) length, iii) orientation in space, iv) polarity, and v) vibration, and, by suitable choice of examples, describe each of these properties;

and so on

Thus, we see that *objectives* can be considered to be specific sets of well–defined activities that a student must exhibit in order to demonstrate achievement of more loosely–defined *aims*.

Writing objectives

All too often, teachers, lecturers and trainers state or write 'objectives' for a course or curriculum which are extremely vague, and are, in fact, more like aims than true objectives. Compiling a list of objectives involves carrying out a thorough analysis of the content subsumed under a general aim and listing the chosen objectives in as unambiguous and explicit a manner as possible, so that both student and teacher have a clear idea of what has to be achieved. The precise form of the objectives will, of course, vary considerably, depending on the nature of the people or bodies for whom they are primarily intended (students, staff, potential recruits, internal committees, course validating bodies, etc). but their function should always be that of defining the *behaviour* expected at the end of the course.

Because of this, the key part of each objective is the *verb*, which should be carefully chosen so as to describe as unequivocally as possible exactly what the student should be able to *do* on completing the particular learning activity (or group of activities) that the objective covers.

In order to achieve this clarity of statement, expressions such as 'to know' 'to understand', 'to *really* understand', 'to appreciate', etc. should be avoided, since they are far too vague to convey the exact nature of the behaviour being sought. Objectives such as:

'the student should *know* the plays of Shakespeare',
'the student must *develop an appreciation* of thermodynamics',
or 'the student should *really understand* Ohm's Law'

tell us little or nothing about what the student will actually be expected to do in order to demonstrate his/her achievement.

Rather, more active, more explicit verbs such as 'state', 'explain', 'define', 'describe', 'predict', 'summarize', 'recognize' and 'criticize' should be used wherever possible, since these can form the basis of much tighter, more clearly-defined objectives. Three examples of objectives that make use of such verbs are given below

- 'the student should be able to *name* and *identify* the bones of the human leg';
- 'the student should be able to *derive* Ohm's Law from first principles';
- 'the student should be able to *summarize* a 1000-word article in 50-100 words'.

Each of the above examples uses verbs which attempt to define an activity or behaviour in terms of what the students should be able to *do* at the end of the relevant section of the course. As a result, their similarity to examination questions is obvious. Indeed, in courses or curricula that are designed using an approach similar to that shown in figure 1, the performance of students in examinations and other forms of assessment provides important information about the suitability of the objectives chosen – information that can be used as a starting point in the next cycle of the course development process. It is no coincidence that, in courses where detailed objectives are *not* clearly stated and made available to the students, the latter place great reliance on past exam papers in order to try to identify the behaviour that is expected of them, i.e. in order to determine the 'objectives' of the course.

The Magerian approach to writing objectives

The case for writing very-tightly-constructed behavioural objectives as an integral part of course, curriculum and lesson design has been strongly influenced by the leading proponent of such objectives – the American

psychologist Rober F. Mager. His definitive work on the subject, 'Preparing Instructional Objectives'*, triggered off a 'bandwagon' movement during the late 1960's and early 1970's, a movement that led to the widespread adoption of a rigorous objectives-based approach to the design of courses and teaching materials. Although Mager's stringent 'rules' for formulating objectives are not so strictly adhered to nowadays, his influence still remains strong in many areas of education and training.

According to Mager and his followers, an objective should be written in clear, unambiguous terms that any teacher or student can understand without the need for explanation, and should include the following three basic elements.

(i) It should state what the student should be able to *do* at the end of the learning experience (i.e. should specify the required *terminal behaviour)*.

(ii) It should state the *conditions* or *constraints* under which this behaviour is to be exhibited.

(iii) It should give a clear indication of the minimum *standard of performance* that is considered acceptable.

Two examples of objectives that have been written in this fashion are given below, and, in each case, all three of the elements that are required by Magerian 'purists' have been identified.

(a) 'The student should be able to weigh an object (*element 1*) of less than 100 grams using a single-pan balance (*element 2*) and obtain the correct answer to four decimal places at least 9 times out of 10 (*element 3*)'.

(b) 'The recruit must be able to fire five shots from a standard-issue rifle (*element 1*) in twenty seconds at a standard circular target 50 metres away (*element 2*) scoring at least 4 bullseyes (*element 3*)'.

Formulating objectives in clear, unambiguous behavioural terms can be deceptively difficult, requiring a considerable amount of skill and practice. Clearly, if Mager's criteria were rigidly adhered to, drawing up a full list of objectives for a teaching or training course would be an onerous and time-consuming task, and the resulting list would probably be highly cumbersome and off-putting. Partly for this reason, there has been a move away from the strict Magerian position in recent years, and, although writers of objectives still try to define the required terminal behaviour as explicitly as possible, they often omit the specifications of the conditions under which the behaviour should be achieved and the minimum satisfactory performance.

* See 'Further Reading' section at end of booklet

This relaxation of Mager's criteria has been particularly pronounced in the case of institution-centred courses in the higher education sector. Here, it is often felt that the wide range and complexity of the subject matter make the writing of highly-specific Magerian objectives impractical, quite apart from the fact that they impose (in many people's opinion) unacceptable constraints on 'academic freedom'.

On the other hand, in the case of teaching/learning situations which are more task-orientated or more student-centred in the sense that the student works largely alone, there is no doubt that Mager-type objectives do help to provide the student with a clear idea of *what* has to be achieved, *how* this has to be achieved, and the *level of performance* that is required to demonstrate satisfactory achievement of the objective. As Mager himself put it: 'if you don't know where you're heading, you'll probably end up someplace else, and not even know it'.

Types of objectives

With the general acceptance of objectives as a key component of the systems approach to course and curriculum design, it has become fashionable to think in terms of broad types of objectives. Here, another American, Benjamin Bloom, has been extremely influential in clarifying and organizing educational thought regarding the classification of objectives. Bloom and his co-workers contend that objectives are attainable in three distinct areas, or *domains*, to which they have assigned suitably impressive jargon names: the *cognitive domain, affective domain* and *psychomotor domain.* At the risk of over-simplication, these can be thought of as being respectively concerned with *knowledge-related objectives, attitude-related objectives* and *motor skills-related objectives.* Let us now examine them in more detail.

(i) *The Cognitive Domain* This contains objectives which are related to the acquisition and application of knowledge and understanding, and probably includes the great majority of educational and training objectives. As we will see later, Bloom has further categorized this area into six sub-areas, which he claims form an ascending hierarchy, with each sub-area dealing with a progressively higher level of sophistication at which knowledge and understanding can be displayed.

An example of a simple cognitive objective might be: 'The student should be able to calculate all the dimensions of a triangle given the lengths of two sides and the size of the angle between them'.

(ii) *The Affective Domain* This contains objectives that are concerned with attitudes and feelings which are brought about as a result of some educational process. Bloom and his co-workers have again further divided this domain into sub-areas, in this case five in number, which they again believe form an ascending educational hierarchy. In general, affective objectives are much less easy to formulate than cognitive objectives, since the behaviour expected is often difficult to identify and virtually impossible to quantify. Also, although they are often just as important as cognitive objectives (more so, in some cases), they can be extremely difficult to teach towards in a formal educational situation.

An example of an affective objective might be: 'The trainee lecturer should learn to exercise empathy when counselling students'.

(iii) *The Psychomotor Domain* This contains objectives that deal with the development of manipulative or physical skills – things like measuring, setting up and using equipment, using tools, drawing graphs, and so on.

An example of a psychomotor objective might be: 'The student should be able to assemble and use the distillation apparatus provided'.

Although these three areas might, at first sight, seem to constitute neat and distinct packages, real life does not allow things to be quite so simple, andthe domains do in fact interact to a considerable extent. For example, working in a science laboratory or driving a car both involve a broad spectrum of objectives drawn from all three domains, namely, the acquisition and application of knowledge (*cognitive domain*), the development of appropriate attitudes to safety, together with responsibility and confidence (*affective domain*), and, of course, the development of manipulative ability and motor skills (*psychomotor domain*). Also, it is normally virtually impossible to bring about desirable attitude changes without an associated increase in knowledge, while, conversely, the development of a positive attitude to work or study will almost invariably exert a favourable influence on the uptake of knowledge. Thus, the cognitive and affective domains are, in fact, intimately linked, and cannot really be considered in isolation. Similarly, the psychomotor domain has links with each of the other domains – albeit not quite so strong.

There is a strong and growing feeling in higher education that, while cognitive knowledge and psychomotor skills remain important aspects of courses, much more could and should be done to foster and develop broader-based objectives related to the skills required by a graduate in later life-skills which are much sought after by employers when recruiting new staff. Examples of such 'broader' skills include decision making, communication, problem solving, creative thinking, and interpersonal skills. In a complex and rapidly changing society, students are not likely to succeed for long in the outside world purely on the basis of cognitive

attainment at college. The 'Education for Capability' movement argues along these lines when stressing the importance of *process* rather than *content* in learning. Indeed if the description of education as 'what is left after the facts have been forgotten' is accepted as having value, then the argument for formulating objectives related to the 'broader skills' area, together with careful consideration of approaches and methods likely to foster their development, becomes very powerful.

The classification system proposed by R. H. Gagné has a category called 'Intellectual Skills' which includes problem solving as the highest level. It also has a category called 'Cognitive Strategies' which refers to internally-organised skills that govern the student's behaviour in learning, remembering, and thinking. Being directed toward self-management of learning and thinking, the latter are obviously different from Intellectual Skills, and are continually being refined with practice as the learner encounters situations that require learning, remembering, and solving or defining problems.

Bloom's taxonomies of educational objectives

Let us now take a closer look at the two highly-influential 'Taxonomies of Educational Objectives' that have been published by Bloom and his co-workers. The first, which dealt with the cognitive domain, was published in 1956, while the second, which covered the affective domain, appeared in 1964.*

Of the two books, the one dealing with the alleged hierarchical structure of the cognitive domain has been by far the more influential, having had a considerable effect on both curriculum planning and assessment. Bloom's six subdivisions of the cognitive domain are listed below, in order of increasing sophistication of the mental processes involved.

(i) *Knowledge* – the lowest level of cognitive objective. To demonstrate the attainment of objectives at this level, students would be expected to perform such tasks as name the parts of an object, point out a certain object, state a definition, recognize a phenomenon when it is seen, and so on.

(ii) *Comprehension* – The lowest level of understanding. Activities demonstrating comprehension include selecting an example of a particular phenomenon, giving reasons for a phenomenon, classifying objects into categories, extrapolating trends, translating verbal material into symbolic statements, and so on.

(iii) *Application* – the application of theoretical statements in real situations.Examples would be for the student to calculate a mathematical result, perform a standard task, use a particular set of rules and procedures, predict the result of a proposed course of action, and so on

(iv) *Analysis* – this involves the breakdown of material into its constituent parts, including the ability to analyse elements and relationships of elements, compare and contrast alternatives, justify the adoption of certain procedures, and so on.

(v) *Synthesis* – this involves the combination of elements or components to form new structured wholes. Skills involved include the ability to write an original essay, propose ways of testing hypotheses, derive mathematical generalizations, and so on.

(vi) *Evaluation* – according to Bloom, the highest level of cognitive objective, involving making judgements (quantitative and qualitative) about the extent to which material satisfies evidence or criteria. This includes the abilities to indicate logical fallacies in arguments, argue for or against a proposal, compare a work with others of recognized excellence, and so on.

What Bloom is suggesting is the existence of a *continuum* in the development of cognitive attainment, from the simple and concrete to the complex and abstract. The six levels should be thought of as milestones on the way to perfect accomplishment rather than watertight categories with specific and exclusive characteristics. By writing objectives at these different levels, a course designer should be able to generate appropriate types of task or assessment questions. The taxonomy does not, incidentally, make any attempt to formulate general rules about how one should teach in order to achieve particular objectives.

Attempts to validate Bloom's taxonomy have, in general, proved inconclusive. However, the results of much of the research that has been done tends to cast doubt on the validity of some of the basic assumptions that were made by Bloom in compiling the taxonomy. A case in point is the assumption that the categories are hierarchically arranged, which is acceptable only if the hierarchy is viewed as progressing *unevenly* from low cognitive levels to higher cognitive levels. For example, the mental processes that are involved in moving from 'comprehension' to 'application' appear to be different in character and more sharply defined than those that are involved in moving from 'knowledge' to 'comprehension' or from 'application' to 'analysis'. Indeed many educationalists now describe cognitive skills as either *lower cognitive* or *higher cognitive*, rather than referring specifically to one of Bloom's six sub-areas.

Bloom's classification for the affective domain is given below, again in ascending hierarchical order.

(i) *Receiving* – developing an awareness of, and willingness to receive, certain stimuli such as the aesthetic factors of a subject.

(ii) *Responding* – showing active attention at a low level, i.e. taking an interest.

(iii) *Valuing* – perceiving phenomena as having worth, and revealing behaviour consistent with this attitude.

(iv) *Organization* – conceptualization of values and ordered relationships between values.

(v) *Characterization* – organization of values into a total and consistent philosophy.

To date, very little research designed to test the validity of this proposed hierarchy has been carried out, largely because of the intrinsic difficulties associated with carrying out quantitative measurements of affective changes.

Despite the above reservations regarding their validity, Bloom's taxonomies have been of great value (particularly in the cognitive domain) in that they have provided a useful formalized classification of objectives in an area where formalization is difficult. Their main use has been in *analysing* objectives and as diagnostic tools rather than as prescriptive tools for setting objectives. Two areas where the taxonomies have had a particularly important impact are *curriculum design* and *assessment*.

In curriculum design, for example, pre-written course objectives often tend to be concentrated in the *higher* cognitive sub-areas of 'application', 'analysis', etc, while the main teaching instruments (lectures and/or individualized study) are perhaps best suited to developing the *lower* cognitive skills of 'knowledge' and 'comprehension'. Careful analysis of course objectives can point to the need for adopting a much broader range of teaching methods designed to help students achieve objectives that lie in these highly-important higher cognitive areas.

In the field of assessment, it is possible, by 'matching' test questions with pre-determined objectives at various levels, to devise a test to precise specifications, e.g. 40% recall (knowledge), 20% comprehension, 20% application, 10% analysis, 5% sythensis and 5% evaluation. Such a breakdown not only helps teachers and lecturers to clarify their thinking regarding the selection of assessment questions, but also helps them to avoid mistakes like basing a supposedly high-level examination mainly on the simple recall of learned material or attempting to test knowledge of factual material by setting a question based almost entirely on reasoning. A well-stocked bank of suitably-graded and tested objective test questions can be extremely useful in pre-specified tests of this sort.

Some advantages of using objectives

Detailed, well-written objectives allow both teaching staff *and* students to have a clear picture of the behaviour that is expected of the latter at the end of a course. This can help to provide direction and stability in the course, and can also help to guard against over-reliance on a particular staff

member or idiosyncratic interpretation of syllabuses. It is, of course, strongly recommended that the *students* should always be included in this pre-knowledge of objectives. All too often, their only clue to course objectives comes from a study of previous exam papers – a situation that is difficult to defend, since students have quite enough problems to face without being involved in academic 'guessing games'.

Nor is this mutual awareness of objectives limited to the more academic aspects of a course, since it is also possible to employ an objectives-based approach when planning laboratory and other practical work. Here, it should, in principle, be possible to provide the students with a clear indication of the desired outcomes of such work *before* the start of each practical session. The need for such a procedure was emphasized by the results of a research project that was carried out in one of the science departments of a large Scottish university. This compared the tutors' intended (but unwritten) objectives with the students' perceptions of the educational objectives of the various laboratory experiments, and it was found that any resemblance between the two was purely coincidental!

Another advantage that clear behavioural objectives can provide is in adjusting teaching methods to facilitate the achievement of the stated objectives. If a teacher has made a serious attempt to analyse the objectives of the course he is teaching and compares his teaching methods with these, some anomalies will probably become apparent. If he is honest, he may well conclude that the methods adopted have only a remote chance of enabling students to attain some of the stated objectives and take appropriate action. However, objectives need not be restrictive, and, within the framework which they provide, there may be many possible routes to the stated goals (see booklets 2-5 in this series).

A further benefit which can arise from a clear statement of objectives is that a teacher who is in possession of such objectives should be in a much better position to decide how they may be assessed, since he should know exactly what behaviour he is supposed to be assessing. Different types of behaviour require different forms of assessment, and methods that may be highly appropriate for assessing lower cognitive skills such as knowledge and understanding may well be far less suitable for assessing higher-level skills such as reasoning, creative thinking and logical presentation. This is discussed in detail in the various booklets on assessment (numbers 20-23).

It is not, of course, being suggested that *all* the objectives of a course can be assessed in a quantitative manner; indeed, in some cases, it is difficult to assess them at all, particularly in the case of those that lie in the affective rather than the cognitive domain and in the broader 'life skill' areas discussed previously. Nevertheless, it is becoming increasingly widely accepted that objectives of this type are an extremely important component of most courses, and may, in some cases, be the longest-lasting and most beneficial outcomes of the course. Thus, it is highly desirable that such

objectives be included in the list of course objectives; even though they cannot all be formally assessed, they do at least help give direction to the course, as well as focusing attention on the need to use teaching methods that may be capable of achieving them.

Finally, the very act of sitting down to write a list of course objectives can be an extremely useful staff development exercise in its own right. It not only forces a teacher to think deeply about what he is trying to achieve, but, in many cases, also makes him take the first step towards a systematic approach to course design and course monitoring.

Some weaknesses of the objectives-based approach

One danger of adopting an objectives-based approach to course design is that the objectives may be given greater status than they deserve. Despite their name, objectives are anything but 'objective' in the manner in which they are selected and written, since both processes are usually highly subjective in character. Thus, objectives should never be treated as if they are in any way sacrosanct; they are, after all, merely the end result of a value judgment on someone's part.

Another danger inherent in a thorough-going objectives-based approach is that teaching and learning may become so prescribed that spontaneity withers and initiative is stifled. Also, a total concentration on the achievement of clearly-defined objectives may lead to the production of students who are certainly well-trained in specific areas, but who lack the broad spectrum of abilities, skills and desirable attitudinal traits that are normally associated with a balanced, 'rounded' education. When a student is being trained in a skill where straightforward mastery is required, e.g. learning the rules for naming chemical compounds, or learning how to operate complex machinery, a rigid set of behavioural objectives is usually very much in order. Also, when a piece of individualized instruction involving, say, written or computer-based material is being designed and evaluated, a clear set of objectives is always extremely valuable to both learner and designer. However, when a teacher is concerned with the outcomes of education in its broadest sense, there are many aspects which defy circumscription in the form of set objectives. Indeed, one could argue that it is sheer nonsense to suggest that a teacher should only teach towards that which can be formulated in terms of Mager-type objectives or that which can be rigidly assessed. It is obviously the case that some subjects (e.g. mathematics and science) lend themselves more readily to a 'straight' objectives-based approach than others (e.g. art appreciation and debating); nevertheless, even in these subjects, it is important that the teaching/learning process should have a *direction*.

A less fundamental, but very practical, weakness of the objectives-based approach is that objectives can be difficult and time-consuming to construct. Many teachers may feel that they simply do not have the time to

produce well-written objectives, and, if insufficient time and skill are devoted to the task, the net result may well be anything but beneficial to the course. For example, it is usually the simplest and perhaps the most trivial objectives that are the easiest to write in 'standard format'; this may lead to low-grade objectives of this type dominating a course at the expense of potentially more valuable goals which are not included simply because they are less easy to encapsulate in unambiguous statements.

Choosing valid objectives

It has been argued abcve that the precise choice of objectives for a course is essentially a subjective decision based on a series of value judgments. The factors and requirements involved in the compilation of a set of course objectives have their roots in a number of sources:

(i) *Vocational needs* There may be a need for certain specific skills and knowledge dictated by a student's possible future job, profession or social role.

(ii) *The 'cultural' view* The concept of 'the subject for its own sake', which views education as passing on a body of accepted knowledge.

(iii) *Social factors* The knowledge, skills and attitudes held to be desirable by the society in which the student lives.

(iv) *'Student' factors* The individual student may be interested in attaining certain knowledge or skills.

(v) *'Teacher' factors* The individual teacher may have personal interests and preferences which he or she feels should be built into the course.

Faced with these often conflicting factors, we see how vital it is to carry out a careful and critical analysis of each in order to establish their relative importance – both during the formulation of objectives for a course or curriculum and throughout the subsequent process of design and development. The level and function of the course or curriculum itself will also exert a considerable influence on these matters, as will the nature of the institution or environment in which it is to be operated. Finally, we should always remember that course or curriculum development is a *cyclical* process, and that all objectives should themselves be re-appraised at regular intervals – not only to determine whether they are being achieved in the course, but also to establish whether they continue to reflect a valid interpretation of the course's direction and emphasis; if they do not, then it is time to change them.

Further reading

(i) *A Handbook of Educational Technology*, by F Percival and H I Ellington; Kogan Page, London; 1984. (An introductory text on educa-

tional technology specially written for practising teachers and lecturers; this discusses educational objectives in the context of an overall systems approach to course and curriculum design and shows how teaching methods can be matched with objectives.)

(ii) *Preparing Instructional Objectives*, by R F Mager; Fearon, Palo Alto, California; 1962. (Still the definitive text on how to write instructional objectives, although some of the ideas are now somewhat dated.)

(iii) *Taxonomy of Educational Objectives. Book 1 : Cognitive Domain*, edited by B S Bloom; Longman, London; 1956. (An extremely useful reference book, but not the sort of thing you would want to read from cover to cover!)

(iv) *Taxonomy of Educational Objectives. Book 2 : Affective Domain*, by B S Bloom D R Krathwohl and B Masia; Longman, London; 1964 (Another useful reference book, although not as widely – accepted and generally applicable as Book 1.)